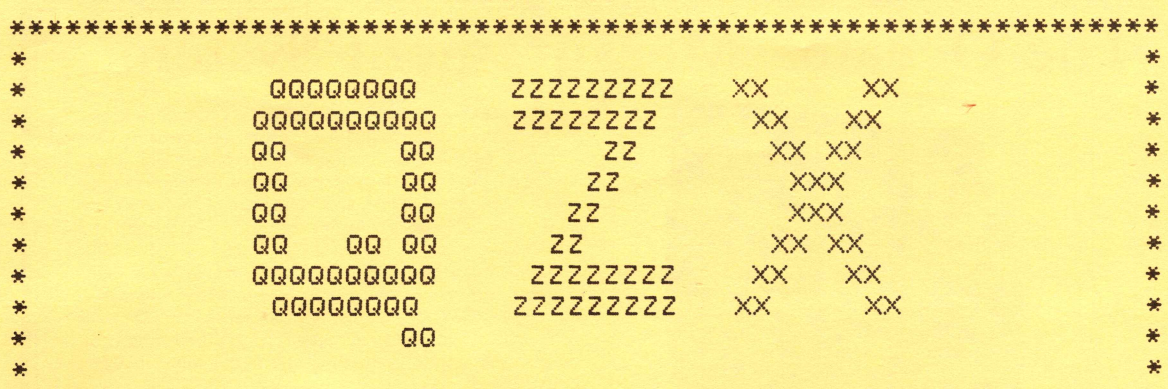
QQQQQQQQ ZZZZZZZZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQ QQ ZZ XX XX
QQ QQ ZZ XXX
QQ QQ ZZ XXX
QQ QQ QQ ZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQQQQQQQ ZZZZZZZZZ XX XX
QQ

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Alex F. Burr,K5XY
Publisher

Ambrose 'Bo' Barry,W4GHV/5
Editor

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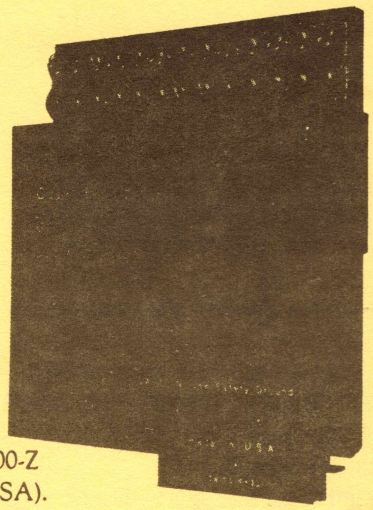
* Publisher's Notes

N O T I C E

Your mailing label now includes the expiration date of your QZX subscription.

The Occam™ Measurement System



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$89 ppd (USA).

Monitor your furnace, appliances, solar collector or house and get immediate feedback on energy improvements. Occam's model 2900-Z measurement system for your ZX-81 or TS-1000 computer measures temperature, DC and AC voltages, DC current, and frequency on 14 channels under software control.

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Frequency	0..10KHz	1 count

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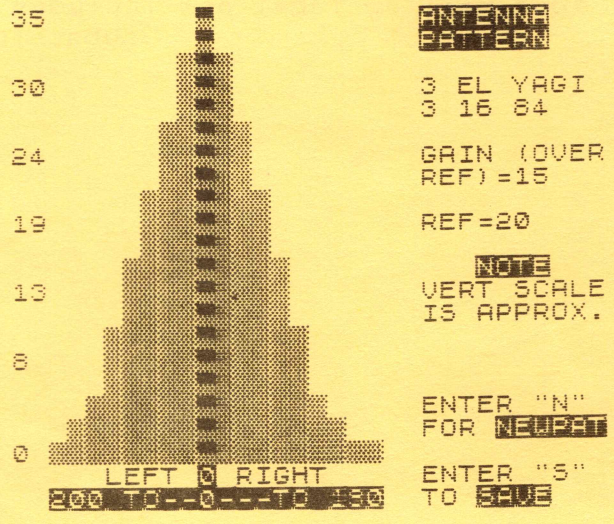
Error Analysis Program

E. Allen Brown, WA3FYZ

This program may be of interest to QZX readers who are also college physics students, as I am. As part of my lab assignment, I am required to include a mean value, standard deviation, and standard error of the mean from a set of given, or observed data. This error analysis program greatly reduces the amount of time spent plugging & chugging on the old handheld calculator, & the set of data need only be entered once with this program. (PROGRAM ON PAGE 3)



ANTENNA PATTERN USING WB4FXD'S PROGRAM ON PAGE 6

```
 10 REM ERORAN*
 20 REM*ERROR ANALYSIS PROGRAM*
 30 REM*BY E. ALLEN BROWN*
 40 REM*WA3FYZ*
 50 CLS
 60 FAST
 70 PRINT AT 10,0;"ENTER THE NU
MBER OF MEASUREMENTS"
 80 INPUT N
 90 IF N<=0 THEN GOTO 10
100 DIM A(N)
110 LET B=0
120 LET M=1
130 CLS
140 PRINT AT 10,5;"ENTER MEASUR
EMENT ";M
150 INPUT A(M)
160 REM*A(M) IS X SUBSCRIPT I*
170 LET B=B+A(M)
180 REM*B IS SIGMA A(M)*
190 LET M=M+1
200 IF M<=N THEN GOTO 130
210 LET AV=B/N
220 REM*AV IS AVERAGE (MEAN)*
230 CLS
240 LET M=1
250 LET T=0
260 LET T=T+(A(M)-AV)*(A(M)-AV)
270 LET M=M+1
280 IF M<=N THEN GOTO 260
290 IF N=1 THEN LET N=1.0000001
300 LET S=SQR (T/N-1)
310 REM*THE STANDARD
        DEVIATION, S, IS THE
        SQUARE ROOT OF THE
        SUM OF THE DIFFERENCES
        BETWEEN THE MEAN AND
        THE INDIVIDUAL
        MEASUREMENTS SQUARED,
        SIGMA (X MINUS (X SUB-
        SCRIPT I)) RAISED TO
        THE SECOND POWER, THEN
        DIVIDED BY THE NUMBER
        OF INDIVIDUAL MEASURE-
        MENTS MINUS ONE, N-1*
320 LET R=S/SQR N
330 REM*THE STANDARD ERROR OF
        THE MEAN, S SUBSCRIPT
        X, IS THE STANDARD
        DEVIATION, S, DIVIDED
        BY THE SQUARE ROOT OF
        THE NUMBER OF INDIVID-
        UAL MEASUREMENTS, N*
340 PRINT AT 0,8;"ERROR ANALYSI
S"
350 PRINT AT 5,0;"THE MEAN VALU
E (AVERAGE) OF THE ENTERED DATA
IS: ";AV
360 PRINT AT 10,0;"THE STANDARD
 DEVIATION IS:       ";S
370 PRINT AT 15,0;"THE STANDARD
 ERROR OF THE MEAN  IS: ";R
380 PRINT AT 20,0;"  PRESS ANY
KEY EXCEPT SPACE"
390 PAUSE 1E5
400 GOTO 50
410 REM*PRESS RUN TO BEGIN*
420 REM*TO SAVE ENTER GOTO 430*
430 SAVE "ERRORAN"
440 RUN
```

```
 10 REM "FLAG
 20 REM "COPYRIGHT 1983-T.GILLC
AS"
 30 FOR L=2 TO 2
 40 FOR C=1 TO 41
 50 FOR C=1 TO 41
 60 PLOT L,C
 70 NEXT C
 80 FOR L=19 TO 19
 90 FOR C=41 TO 17 STEP -1
100 PLOT L,C
110 NEXT C
120 FOR L=1 TO 5
130 FOR C=1 TO 10
140 PRINT AT L,C;"■"
160 NEXT C
170 NEXT L
190 FOR C=11 TO 24
220 FOR L=1 TO 1
230 PRINT AT L,C;"■"
250 NEXT C
260 FOR C=11 TO 24
270■FOR L=3 TO 3
280 PRINT AT L,C;"■"
300 NEXT C
310 FOR C=11 TO 24
320 FOR L=5 TO 5
330 PRINT AT L,C;"■"
350 NEXT C
360 FOR C=1 TO 24
370 FOR L=7 TO 7
380 PRINT AT L,C;"■"
400 NEXT C
410 FOR C=1 TO 24
420 FOR L=9 TO 9
430 PRINT AT L,C;"■"
450 NEXT C
460 FOR C=1 TO 24
470 FOR L=11 TO 11
480 PRINT AT L,C;"■"
490 NEXT C
500 FOR C=1 TO 24
510 FOR L=13 TO 13
520 PRINT AT L,C;"■"
530■NEXT C
540 PRINT AT 19,6;"E PLURIBUS U
NUM"
550 PAUSE 200
560 CLS
570 GOTO 7
```


Extend your ZX81/TS1000/TS1500: Add Memory that won't Forget!

➧ *DESCRIBED IN* **Radio-Electronics**.
JULY/AUGUST 1983

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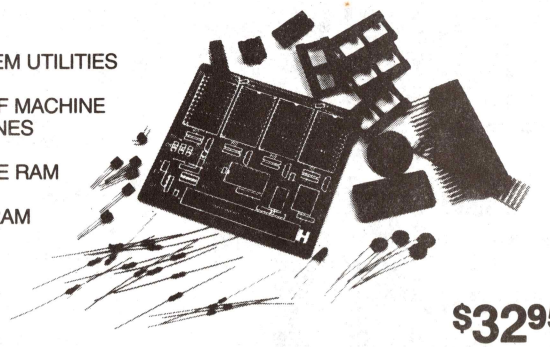


$32.95
plus $1.95 shipping and handling

► *READ THE REVIEWS:*

What a super product!...conceived and executed very nicely...and with quality components.
(SYNTAX QUARTERLY Winter 82)

8K Nonvolatile memory is a gem! It has so many possible uses...I recommend this board most heartily.
(OKLAHOMA S.U.G. Newsletter 1/3)

We found the documentation to be far superior to that (of) most hardware we've received.
(S.U.N. Newsletter Nov/Dec 82)

For versatility this is even better than an EPROM...ranks quite high on the list of "must-haves"...
(SYNC Magazine Mar/Apr 83)

Provides the user with instant software...an extremely versatile memory extension...
(Z-WEST June 83)

INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8K to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

Sample utilities are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile — the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

ASSEMBLY

Complete step-by-step instructions in a 20 page manual make assembly of the board easy. The kit (pictured above) is complete with a silkscreened solder-masked printed circuit board, all capacitors, resistors, transistors, sockets, connectors, integrated circuits, and the lithium cell. The board is supplied with one 2K CMOS 6116LP-3 RAM — it will accomodate three more for a total of 8K.

Complete kit with one 2K 6116LP-3	$32.95
Additional three 6116LP-3	$18.00
Bare pc board & manual	$13.05
Kit for EPROM use only	$22.95
Assembled & tested with 2K	$47.95
Assembled & tested with 8K	$65.95
Shipping & handling per order	$ 1.95

Send check or money order to the address below:

HUNTER, 1630 FOREST HILLS DRIVE, OKEMOS, MI 48864

FORMU-CALC, KAZLHO

```
  1 REM "FORMULAS"
 10 LET C$="********************
**********"
 20 GOTO 220
 30 INPUT R(A)
 40 PRINT R(A)
 50 FOR Z=1 TO 10
 60 NEXT Z
 70 PRINT AT 14,0;"
 80 RETURN
 90 PRINT AT 19,0;C$;"*
ENTER  CHOICE          *";C$
100 INPUT C
110 RETURN
120 PRINT AT 19,0;C$;"* PRESS
 ENTER   TO  CONTINUE *";C$
130 LET A$=INKEY$
140 IF A$="" THEN GOTO 130
150 RETURN
160 INPUT N
170 PRINT N
180 PRINT
190 PRINT C$
200 PRINT
210 RETURN
220 GOSUB 3070
230 INPUT P$
240 CLS
250 PRINT C$;"*";TAB 31;"**
   PROGRAM MENU          **";TA
B 31;"*";C$
260 PRINT ,,,,TAB 4;"(1) OHM""S
LAW FOR DIRECT";TAB 8;"CURRENT"
270 PRINT
280 PRINT TAB 4;"(2) RESISTANCE
 FORMULAS"
290 PRINT
300 PRINT TAB 4;"(3) CAPACITANC
E FORMULAS"
310 PRINT
320 PRINT TAB 4;"(4) INDUCTANCE
 FORMULAS"
330 PRINT
340 PRINT TAB 4;"(5) COIL WINDI
NG FORMULAS"
350 GOSUB 90
360 IF C=1 THEN GOTO 420
370 IF C=2 THEN GOTO 1220
380 IF C=3 THEN GOTO 2010
390 IF C=4 THEN GOTO 2690
400 IF C=5 THEN GOTO 3410
410 GOTO 350
420 CLS
430 PRINT C$;"*";TAB 31;"** OHM
""S LAW FOR DIRECT CURRENT **";T
AB 31;"*";C$
440 PRINT ,,,,TAB 4;"DO YOU WISH
 TO CALCULATE:"
450 PRINT
460 PRINT TAB 8;"(1) CURRENT"
470 PRINT TAB 8;"(2) VOLTAGE"
480 PRINT TAB 8;"(3) RESISTANCE
"
490 PRINT
500 PRINT TAB 8;"(4) RETURN TO
MAIN";TAB 12;"MENU"
510 GOSUB 90
520 IF C=1 THEN GOTO 590
530 IF C=2 THEN GOTO 600
540 IF C=3 THEN GOTO 1010
550 IF C=4 THEN GOTO 240
560 GOTO 530
570 CLS
580 PRINT C$;"*";TAB 31;"**
  CALCULATE CURRENT      **";TA
B 31;"*";C$
590 PRINT ,,"ENTER:",,,TAB 3;"V
OLTAGE IN VOLTS: ";
600 INPUT E
610 PRINT E
620 PRINT ,,TAB 3;"RESISTANCE I
N OHMS: ";
630 INPUT R
640 PRINT R
650 LET I=E/R
660 GOSUB 160
670 PRINT "CURRENT IN AMPERES =
";I
680 IF P$="N" THEN GOTO 780
690 LPRINT "GIVEN THE FOLLOWING
DATA:"
700 LPRINT
710 LPRINT "VOLTAGE IN VOLTS =
";E
720 LPRINT
730 LPRINT "RESISTANCE IN OHMS
= ";R
740 LPRINT C$
750 LPRINT "THEN:",,,,"CURRENT
IN AMPERES = ";I
760 GOSUB 120
770 GOTO 1220
780 CLS
790 PRINT C$;"*";TAB 31;"**
  CALCULATE VOLTAGE      **";TA
B 31;"*";C$
800 PRINT ,,"ENTER:",,,TAB 3;"C
URRENT IN AMPERES: ";
810 INPUT I
820 PRINT I
830 PRINT ,,TAB 3;"RESISTANCE I
N OHMS: ";
840 INPUT R
850 PRINT R
860 LET E=I*R
870 GOSUB 160
880 PRINT "VOLTAGE IN VOLTS = "
;E
890 IF P$="N" THEN GOTO 990
900 LPRINT "GIVEN THE FOLLOWING
DATA:"
910 LPRINT
920 LPRINT "CURRENT IN AMPERES
= ";I
930 LPRINT
940 LPRINT "RESISTANCE IN OHMS
= ";R
950 LPRINT C$
960 LPRINT "THEN:",,,,"VOLTAGE
IN VOLTS = ";E
970 GOSUB 120
980 GOTO 1220
990 CLS
1000 PRINT C$;"*";TAB 31;"** CAL
CULATE RESISTANCE IN OHMS **";TA
B 31;"*";C$
1010 PRINT ,,"ENTER:";,,,TAB 3;"
CURRENT IN AMPERES: ";
1020 INPUT I
1030 PRINT I
1040 PRINT ,TAB 3;"VOLTAGE IN VO
LTS: ";
1050 INPUT E
1060 PRINT E
1070 LET R=E/I
1080 GOSUB 160
1090 PRINT "RESISTANCE IN OHMS =
";R
1100 IF P$="N" THEN GOTO 1200
1110 LPRINT "GIVEN THE FOLLOWING
 DATA:"
1120 LPRINT
1130 LPRINT "CURRENT IN AMPERES
= ";I
1140 LPRINT
1150 LPRINT "VOLTAGE IN VOLTS =
";E
1160 LPRINT C$
1170 LPRINT "THEN:",,,,"RESISTAN
CE IN OHMS = ";R
1180 GOSUB 120
1190 GOTO 1220
1200 CLS
1210 PRINT C$;"*";TAB 31;"**
   POWER EXPENDED        **
  IN LOAD RESISTANCE     **";TA
B 31;"*";C$
1220 LET P=E*I
1230 PRINT AT 11,3;"POWER EXPEND
ED = ";P
1240 IF P$="Y" THEN LPRINT "POWE
R EXPENDED = ";P
1250 GOSUB 120
1260 GOTO 420
1270 CLS
1280 PRINT C$;"*";TAB 31;"**
 RESISTANCE FORMULAS      **";TA
B 31;"*";C$
1290 PRINT ,,,TAB 4;"DO YOU WISH
 TO CALCULATE:"
1300 PRINT
1310 PRINT
1320 PRINT TAB 3;"(1) RESISTORS
IN SERIES"
1330 PRINT
1340 PRINT TAB 3;"(2) RESISTORS
IN PARALLEL"
1350 PRINT
1360 PRINT TAB 3;"(3) RETURN TO
MAIN MENU"
1370 GOSUB 90
1380 IF C=1 THEN GOTO 1440
1390 IF C=2 THEN GOTO 1760
1400 IF C=3 THEN GOTO 240
1410 GOTO 1370
1420 CLS
1430 PRINT C$;"*";TAB 31;"**
 RESISTANCE FORMULAS      **";TA
B 31;"*";C$
1440 PRINT ,,"ENTER:",,,"NUMBER
 OF RESISTORS IN SERIES:";
1450 GOSUB 160
1460 LET R=0
1470 DIM R(N)
1480 PRINT "ENTER RESISTANCE (IN
 OHMS) OF:"
1490 FOR A=1 TO N
1500 PRINT AT 14,0;"RESISTOR NUM
BER ";A;": ";
1510 GOSUB 30
1520 NEXT A
1530 FOR A=1 TO N
1540 LET R=R(A)+R
1550 NEXT A
1560 CLS
1570 PRINT C$;"*";TAB 31;"**  T
OTAL CURRENT RESISTANCE  **";TA
B 31;"*";C$
1580 PRINT
1590 FOR A=1 TO N
1600 PRINT "RESISTOR NUMBER ";A;
" = ";R(A)
1610 IF A=8 THEN GOSUB 120
1620 IF A=8 THEN CLS
1630 IF A=21 THEN GOSUB 120
1640 IF A=21 THEN CLS
1650 NEXT A
1660 GOSUB 190
1670 PRINT "TOTAL RESISTANCE = "
;R
1680 IF P$="N" THEN GOTO 1760
1690 FOR A=1 TO N
1700 LPRINT "RESISTOR NUMBER ";A
;" = ";R(A)
1710 NEXT A
1720 LPRINT C$
1730 LPRINT "TOTAL RESISTANCE =
";R
1740 GOSUB 120
1750 GOTO 1290
1760 CLS
1770 PRINT C$;"*";TAB 31;"**
RESISTANCE IN PARALLEL   **";TA
B 31;"*";C$
1780 PRINT ,,"ENTER:",,,"NUMBER
 OF RESISTORS"," IN PARALLEL CIR
CUIT: ";
1790 GOSUB 160
1800 DIM R(N)
1810 PRINT "ENTER RESISTANCE (IN
 OHMS) OF:"
1820 FOR A=1 TO N
1830 PRINT AT 15,0;"RESISTOR NUM
BER ";A;": ";
1840 INPUT R(A)
1850 PRINT R(A)
1860 FOR Z=1 TO 10
1870 NEXT Z
1880 PRINT AT 15,0;"
1890 NEXT A
1900 IF N>2 THEN GOTO 1950
1910 LET R=(R(1)*R(2))/(R(1)+R(2
))
1920 GOTO 1500
1930 LET R=0
1940 FOR A=1 TO N
1950 LET R=1/R(A)+R
1960 NEXT A
1970 LET R=1/R
1980 GOTO 1500
1990 CLS
2000 PRINT C$;"*";TAB 31;"**
 CAPACITANCE FORMULAS     **";TA
B 31;"*";C$
2010 PRINT ,,,TAB 4;"DO YOU WISH
 TO CALCULATE:"
2020 PRINT
2030 PRINT
2040 PRINT TAB 2;"(1) CAPACITORS
 IN PARALLEL"
2050 PRINT
2060 PRINT TAB 2;"(2) CAPACITORS
 IN SERIES"
2070 PRINT
2080 PRINT TAB 2;"(3) RETURN TO
MAIN MENU"
2090 GOSUB 90
2100 IF C=1 THEN GOTO 2160
2110 IF C=2 THEN GOTO 2500
2120 IF C=3 THEN GOTO 240
2130 GOTO 2090
2140 CLS
2150 PRINT C$;"*";TAB 31;"**  C
APACITANCE IN PARALLEL   **";TA
B 31;"*";C$
2160 PRINT ,,"ENTER:",,,"NUMBER
 OF CAPACITORS"," IN PARALLEL CI
RCUIT: ";
2170 GOSUB 160
2180 LET R=0
2190 DIM R(N)
2200 PRINT "ENTER CAPACITANCE (I
N PF"S) OF:"
2210 FOR A=1 TO N
2220 PRINT AT 14,0;"CAPACITOR NU
MBER ";A;": ";
2230 GOSUB 30
2240 NEXT A
2250 FOR A=1 TO N
2260 LET R=R(A)+R
2270 NEXT A
2280 CLS
2290 PRINT C$;"*";TAB 31;"**  TO
TAL CIRCUIT CAPACITANCE  **";TA
B 31;"*";C$
2300 PRINT
2310 FOR A=1 TO N
2320 PRINT "CAPACITOR NUMBER ";A
;" = ";R(A)
2330 IF A=8 THEN GOSUB 120
2340 IF A=8 THEN CLS
2350 IF A=21 THEN GOSUB 120
2360 IF A=21 THEN CLS
2370 NEXT A
2380 GOSUB 160
2390 PRINT "TOTAL CAPACITANCE =
";R
2400 IF P$="N" THEN GOTO 2480
2410 FOR A=1 TO N
2420 LPRINT "CAPACITOR NUMBER ";
A;" = ";R(A)
2430 NEXT A
2440 LPRINT C$
2450 LPRINT "TOTAL CAPACITANCE =
";R
2460 GOSUB 120
2470 GOTO 2010
2480 CLS
2490 PRINT C$;"*";TAB 31;"**
CAPACITANCE IN SERIES    **";TA
B 31;"*";C$
2500 PRINT ,,"ENTER:",,,"NUMBER
 OF CAPACITORS IN SERIES:";
2510 GOSUB 16
2520 DIM R(N)
```

```
2550 PRINT "ENTER CAPACITANCE (I
N PF"";S) OF:"
2560 FOR A=1 TO N
2570 PRINT AT 14,0;"CAPACITOR NU
MBER ";A;": ";
2580 GOSUB 30
2590 NEXT A
2600 IF N>2 THEN GOTO 2630
2610 LET R=(R(1)*R(2))/(R(1)+R(2
))
2620 GOTO 2300
2630 LET R=0
2640 FOR A=1 TO N
2650 LET R=R/R(A)+R
2660 NEXT A
2670 LET R=1/R
2680 GOTO 2300
2690 CLS
2700 PRINT C$;"*";TAB 31;"**
  INDUCTANCE FORMULAS      **  (U
ITH NO MUTUAL INDUCTANCE) **";TA
B 31;"*";C$
2710 PRINT ,,,TAB 4;"DO YOU WISH
 TO CALCULATE:"
2720 PRINT
2730 PRINT
2740 PRINT TAB 3;"(1)  INDUCTORS
IN SERIES"
2750 PRINT
2760 PRINT TAB 3;"(2)  INDUCTORS
IN PARALLEL"
2770 PRINT
2780 PRINT TAB 3;"(3)  RETURN TO
MAIN MENU"
2790 GOSUB 90
2800 IF C=1 THEN GOTO 2640
2810 IF C=2 THEN GOTO 3150
2820 IF C=3 THEN GOTO 240
2830 GOTO 2790
2840 CLS
2850 PRINT C$;"*";TAB 31;"**
  INDUCTANCE IN SERIES     **";TA
B 31;"*";C$
2860 PRINT ,,"ENTER:",,,"NUMBER
  OF INDUCTORS IN SERIES:";
2870 GOSUB 160
2880 LET R=0
2890 DIM R(N)
2900 PRINT "ENTER INDUCTANCE (IN
  MH""S) OF:"
2910 FOR A=1 TO N
2920 PRINT AT 14,0;"INDUCTOR NUM
BER ";A;": ";
2930 GOSUB 30
2940 NEXT A
2950 FOR A=1 TO N
2960 LET R=R(A)+R
2970 NEXT A
2980 CLS
2990 PRINT C$;"*";TAB 31;"**  T
OTAL CIRCUIT INDUCTANCE   **";TA
B 31;"*";C$
3000 PRINT
3010 FOR A=1 TO N
3020 PRINT "INDUCTOR NUMBER ";A;
" = ";R(A)
3030 IF A=8 THEN GOSUB 120
3040 IF A=8 THEN CLS
3050 IF A=21 THEN GOSUB 120
3060 IF A=21 THEN CLS
3070 NEXT A
3080 GOSUB 160
3090 PRINT "TOTAL INDUCTANCE = "
;R
3100 IF P$="N" THEN GOTO 3160
3110 FOR A=1 TO N
3120 LPRINT " INDUCTOR NUMBER ";
A;" = ";R(A)
3130 NEXT A
3140 LPRINT C$
3150 LPRINT "TOTAL INDUCTANCE =
";R
3160 GOSUB 120
3170 GOTO 2690
3180 CLS
3190 PRINT C$;"*";TAB 31;"**
INDUCTANCE IN PARALLEL   **
(NO MUTUAL INDUCTANCE)     **";TA
B 31;"*";C$
3200 PRINT ,,"ENTER:",,,"NUMBER
 OF INDUCTORS"," IN PARALLEL CIR
CUIT:"
3210 GOSUB 160
3220 DIM R(N)
3230 PRINT "ENTER INDUCTANCE (IN
 MH""S) OF:"
3240 FOR A=1 TO N
3250 PRINT AT 15,0;"INDUCTOR NUM
BER ";A;": ";
3260 INPUT R(A)
3270 PRINT R(A)
3280 FOR Z=1 TO 10
3290 NEXT Z
3300 PRINT AT 15,0;"
                    "
3310 NEXT A
3320 IF N>2 THEN GOTO 3350
3330 LET R=(R(1)*R(2))/(R(1)+R(2
))
3340 GOTO 2980
3350 LET R=0
3360 FOR A=1 TO N
3370 LET R=1/R(A)+R
3380 NEXT A
3390 LET R=1/R
3400 GOTO 2980
3410 CLS
3420 PRINT C$;"*";TAB 31;"**
COIL WINDING FORMULAS    **";TA
B 31;"*";C$
3430 PRINT ,,,TAB 4;"DO YOU WISH
 TO CALCULATE:"
3440 PRINT
3450 PRINT
3460 PRINT "(1) INDUCTANCE--GIVE
N NUMBER OF TURN, LENGTH,
AND RADIUS"
3470 PRINT
3480 PRINT "(2) NUMBER OF TURNS-
-GIVEN",," LENGTH RADIUS, AND"
,"  INDUCTANCE"
3490 PRINT
3500 PRINT "(3) RETURN TO MAIN M
ENU"
3510 GOSUB 90
3520 IF C=1 THEN GOTO 3560
3530 IF C=2 THEN GOTO 3620
3540 IF C=3 THEN GOTO 240
3550 GOTO 3510
3560 CLS
3570 PRINT C$;"*";TAB 31;"**
 CALCULATE INDUCTANCE     **";TA
B 31;"*";C$
3580 PRINT ,,"ENTER:",,,TAB 3;"N
UMBER OF TURNS: ";
3590 INPUT N
3600 PRINT N
3610 PRINT ,,TAB 3;"MEAN RADIUS
IN INCHES: ";
3620 INPUT A
3630 PRINT A
3640 PRINT ,,TAB 3;"LENGTH OF CO
IL IN INCHES: ";
3650 INPUT B
3660 PRINT B
3670 LET L=((N*A)**2)/((9*A)+(10
*B))
3680 GOSUB 180
3690 PRINT "GIVEN THE ABOVE DATA
",TAB 3;"INDUCTANCE = ";L
3700 IF P$="N" THEN GOTO 3800
3710 LPRINT "GIVEN THE FOLLOWING
 DATA:"
3720 LPRINT
3730 LPRINT "NUMBER OF TURNS = "
;N
3740 LPRINT
3750 LPRINT "MEAN RADIUS IN INCH
ES = ";A
3760 LPRINT
3770 LPRINT "LENGTH OF COIL IN I
NCHES = ";B
3780 LPRINT C$
3790 LPRINT "THEN:",,,,"INDUCTAN
CE (IN MH""S = ";L
3800 GOSUB 120
3810 GOTO 3410
3820 CLS
3830 PRINT C$;"*";TAB 31;"**  CA
LCULATE NUMBER OF TURNS   **";TA
B 31;"*";C$
3840 PRINT ,,"ENTER:",,,TAB 3;"L
ENGTH OF COIL IN INCHES: ";
3850 INPUT B
3860 PRINT B
3870 PRINT ,,TAB 3;"INDUCTANCE D
ESIRED: ";
3880 INPUT L
3890 PRINT L
3900 PRINT ,,TAB 3;"MEAN RADIUS
IN INCHES: ";
3910 INPUT A
3920 PRINT A
3930 LET N=(SQR (L*((9*A)+(10*B)
)))/A
3940 GOSUB 180
3950 PRINT "GIVEN THE ABOVE DATA
-","THE NUMBER OF TURNS NEEDED F
OR  DESIRED INDUCTANCE = ";N
3960 GOTO 3700
3970 CLS
3980 PRINT
3990 PRINT C$;"*";TAB 31;"**
 F O R M U - C A L C      **";TA
B 31;"*";C$
4000 PRINT
4010 PRINT
4020 PRINT TAB 8;"ADAPTED FOR TH
E"
4030 PRINT
4040 PRINT TAB 4;"TIMEX/SINCLAIR
  COMPUTERS"
4050 PRINT
4060 PRINT TAB 15;"BY"
4070 PRINT
4080 PRINT TAB 8;"KRAIG D. PRITT
S"
4090 PRINT TAB 13;"KA2LHO"
4100 FOR Z=1 TO 30
4110 NEXT Z
4120 CLS
4130 PRINT AT 9,0;" DO YOU WISH
TO HAVE THE DATA","          SENT TO
THE PRINTER?"
4140 PRINT ,TAB 13;"(Y/N)"
4150 RETURN
4160 STOP
4170 PRINT "START TAPE",,"PRESS
[redacted]"
4180 INPUT Z$
4190 CLEAR
4200 SAVE "FORMU-CAL[redacted]"
4210 RUN
```

INSTRUCTIONS FOR "FORMU-CALC"

*** KA2LHO HAM HELPER SERIES ***

BY

KRAIG D. PRITTS
KA2LHO

-16 FORMU-CALC (16K)

LOAD "FORMU-CALC". UPON A SUCCESSFUL LOAD THE PROGRAM IS SELF STARTING AND WILL DISPLAY A TITLE SCREEN. AFTER THIS YOU WILL BE ASKED IF YOU WISH TO SEND ALL RESULTS TO A PRINTER. IF YOU SELECT THE AFFIRMATIVE, ALL RESULTS THROUGHOUT THE PROGRAM WILL AUTOMATICALLY TO THE PRINTER. THE PROGRAM WILL NOT BE HARMED IF YOU SELECT YES TO THIS QUESTION BUT DO NOT HAVE A PRINTER ATTACHED. IT MAY GET A BIT ANNOYING HOWEVER AS THE DISPLAY FLICKERS EACH TIME THAT NEW INFORMATION IS SENT TO THE PRINT MECHANISM.

THE MAIN MENU ALLOWS YOU TO CHOOSE BETWEEN ANY ONE OF FIVE FORMULAE:

(1) OHM"S LAW FOR DIRECT CURRENT

(2) RESISTANCE FORMULAE

(3) CAPACITANCE FORMULAE

(4) INDUCTANCE FORMULAE

(5) COIL WINDING FORMULAE

YOUR SELECTION OF ONE OF THESE CHOICES WILL RESULT IN ANOTHER MENU WHICH WILL GUIDE YOU IN THE USE OF THAT PARTICULAR SECTION. THE PROGRAM IS REALLY QUITE EASY AND STRAIGHTFORWARD IN USE. THE MENUS WILL PROVIDE ALL NECESSARY PROMPTS AND RESULT IN THE EASE OF USE BY ANYONE.

I HOPE THAT THIS PROGRAM WILL PROVE USEFUL FOR YOU AND FIND A HELPFUL PLACE IN YOUR HAM SHACK.

73,

Kraig D. Pritts

KRAIG D. PRITTS

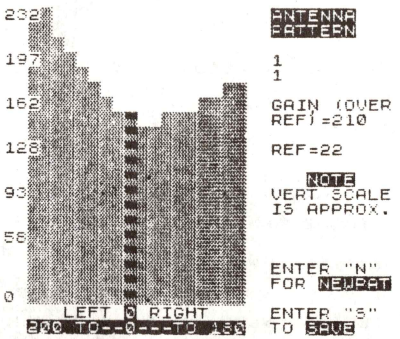
"FORMU-CALC" IS A PROGRAM WHICH PROVIDES FORMULA CALCULATIONS IN FIVE DIFFERENT AREAS OF ELECTRONICS INCLUDING: OHM"S LAW FOR DIRECT CURRENT, RESISTANCE (SERIES AND PARALLEL), CAPACITANCE (SERIES AND PARALLEL), INDUCTANCE (SERIES AND PARALLEL), AND COIL WINDING. EACH SECTION HAS ITS OWN MENU TO ASSIST THE USER AND ALL DATA IS AVAILABLE IN TWO FORMS---SCREEN ONLY OR SCREEN AND PRINTER.

ALL DETAILS OF THE PROGRAM ARE FOUND IN THE INSTRUCTIONS WHICH ACCOMPANY EACH ORDER RECEIVED FOR "FORMU-CALC". THESE INSTRUCTIONS ARE ALSO INCLUDED HERE TO ASSIST YOU IN WORKING WITH THE PROGRAM AS PRESENTED. IF ANYONE FEELS THEY DO NOT HAVE THE TIME TO TYPE IN THIS PROGRAM I WILL MAKE IT AVAILABLE ON TAPE AS PRESENTED HERE FOR THE PRICE OF $6.00. THIS INCLUDES TWO COPIES OF THE PROGRAM ON A CASSETTE, INSTRUCTIONS, AND A LISTING.

ALL INQUIRIES AND/OR ORDERS FOR "FORMU-CALC" OR ANY OTHER PROGRAMS IN THE KA2LHO HAM HELPER SERIES SHOULD BE DIRECTED TO: KRAIG D. PRITTS-KA2LHO, BOX 198, LEONARDSVILLE, NY 13364.

ANTENNA PATTERN PROGRAM - WB4FXD

```
  1 CLS
  5 REM "ANTPAT"
 10 REM TERRY SIMONDS--WB4FXD
 15 REM PO BOX 1558
 20 REM EDGARTOWN, MA 02539
 25 SLOW
 30 LET P=18
 35 LET LN=0
 40 PRINT TAB 5;"ANTENNA PATTER
N-MAKER"
 45 PRINT ,,"THIS PROGRAM ALLOW
S YOU TO DE-  RIVE A RECTANGULAR
 PATTERN OF   ANTENNA RESPONSE F
ROM SIGNAL-   LEVEL READINGS MAD
E AT 18       POINTS AS THE ANTE
NNA IS        ROTATED."
 50 PRINT ,,"A REFERENCE ANTENN
A SHOULD BE   AVAILABLE TO THE R
ECEIVER THRU  THE SAME TYPE/LENG
TH FEEDLINE   AS THE TEST ANTENN
A."
 55 PRINT ,,"AN EXTERNAL SIG SO
URCE IS RE-   QUIRED. USING A DI
STANT SIGNAL  WILL GIVE MARGINAL
 RESULTS BE-  CAUSE OF QSB. USE
A LOCAL STA-  TION MORE THAN SEV
ERAL WAVE-    LENGTHS FROM YOUR
ANTENNA."
 60 PRINT ,,"HIT ENTER TO CONTI
NUE"
 65 INPUT I$
 70 CLS
 75 PRINT "ANTENNA PATTERN-MAKE
R--CONT..."
 80 REM ANTENNA INFORMATION
 85 PRINT ,,"ENTER ANTENNA DESC
R. (10 MAX):"
 90 DIM A$(10)
 92 PRINT AT 21,1;"1234567890▒▒
▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
 95 INPUT A$
100 PRINT AT 3,0;A$
105 PRINT
110 PRINT "ENTER DATE:";
115 DIM D$(10)
120 INPUT D$
125 PRINT AT 5,13;D$
130 FOR T=1 TO 50
135 NEXT T
140 CLS
145 PRINT "ANTENNA PATTERN-MAKE
R--CONT..."
150 PRINT ,,"INSTRUCTIONS FOR S
ETTING REFER- ENCE LEVEL:"
155 PRINT ,,"  1. ROTATE ANTENN
A UNDER TEST      FOR A PEAK RE
ADING ON          S-METER. MAXI
MUM PATTERN       RESOLUTION WI
LL BE REAL-       IZED IF LEVEL
 IS <20."
160 PRINT "   2. SWITCH TO REFER
ENCE ANT-         ENNA AND RECORD
 S-METER          READING."
165 PRINT ,,"ENTER REFERENCE LE
VEL: ";
170 INPUT R$
175 IF R$="" THEN GOTO 170
180 GOSUB 2000
185 LET RL=VAL P$
190 PRINT AT 14,23;RL
195 FOR T=1 TO 50
200 NEXT T
205 CLS
240 PRINT TAB 10;"INSTRUCTIONS"
250 PRINT ,,"1-MAKE FIRST MEAS.
 AT 200 DEG.  ROTATE ANTENNA C
LOCKWISE."
260 PRINT ,,"2-MEASURE EVERY 20
 DEG; ROUND-  OFF READINGS."
280 PRINT ,,"3-PATTERN CENTERED
 ON NORTH OR  ANT BORESIGHT, D
EPENDING ON   WHICH COORDINATE
 SYSTEM USED"
285 PRINT ,,"4-DO NOT MAKE ANY
RECEIVER ADJ- USTMENTS ONCE YO
U HAVE START- ED MAKING MEASUR
EMENTS. ALL   MEASUREMENTS MUS
T BE MADE     UNDER IDENTICAL
CONDITIONS"
290 PRINT ,,"5-CONNECT TEST ANT
TO RECVR."
295 PRINT AT 21,0;"WHEN YOU ARE
READY, HIT ENTER"
300 INPUT U$
305 FAST
310 REM ENTER MEASUREMENTS
320 CLS
330 DIM L(P)
340 LET A=200
350 FOR N=1 TO P
360 GOSUB 500
370 INPUT L$
373 IF L$="" THEN GOTO 370
375 GOSUB 3000
380 LET A=A+20
390 PRINT AT LN-1,25;L(N)
400 IF A>=360 THEN LET A=A-360
410 NEXT N
420 REM ACCURACY CHECK
430 PRINT ,,"THANK YOU. CHECK C
AREFULLY"
440 PRINT "ALL OK--Y OR N?"
450 INPUT U$
460 IF U$="Y" THEN GOTO 660
470 IF U$="N" THEN GOTO 530
480 GOTO 450
490 REM PRINT SUBROUTINE
500 PRINT AT LN,0;"ENTER MEAS.
NO. ";TAB 16;N;TAB 19;"(";A;")";
TAB 24;":";
505 LET LN=LN+1
515 RETURN
520 REM CORRECT ERRORS
530 PRINT "WHICH MEAS. NO. IS W
RONG?"
540 INPUT N
550 IF N<1 OR N>P THEN GOTO 540
560 CLS
570 PRINT "MEAS. NO. ";N;" WAS
";TAB 19;L(N)
580 PRINT ,,"WHAT SHOULD IT BE?
"
590 INPUT L(N)
600 CLS
610 FOR N=1 TO P
620 PRINT "MEAS. NO. ";N;"=";L(
N)
630 NEXT N
640 PRINT
650 GOTO 440
660 CLS
670 REM IDENTIFY MAX. LEVEL
680 LET M=L(1)
690 FOR I=2 TO P
700 IF L(I)<=M THEN GOTO 720
710 LET M=L(I)
720 NEXT I
730 REM NORMALIZE TO MAX
740 LET F=20/M
750 FOR N=1 TO P
760 LET L(N)=L(N)*F
770 NEXT N
780 REM PLOT PATTERN
790 LET Y=2
800 FOR N=1 TO P
805 FOR X=19 TO 19-L(N) STEP -1
810 IF N<>9 THEN GOTO 830
815 PRINT AT X,Y;"▒"
820 GOTO 835
830 PRINT AT X,Y;"▒"
835 NEXT X
840 LET Y=Y+1
850 NEXT N
860 REM ANNOTE DISPLAY
870 PRINT AT 20,5;"LEFT 0 RIGHT
"
880 PRINT "  300 TO--0---TO 180
"
900 PRINT AT 0,22;"ANTENNA"
910 PRINT AT 1,22;"PATTERN"
920 PRINT AT 3,22;A$
930 PRINT AT 4,22;D$
940 PRINT AT 6,22;"GAIN (OVER"
950 PRINT AT 7,22;"REF)=";M-RL
960 PRINT AT 9,22;"REF=";RL
963 REM GENERATE VERT SCALE
965 PRINT AT 0,0;M
970 LET D=INT (10*(M/20)+.5)/10
975 FOR Y=3 TO 15 STEP 3
980 PRINT AT Y,0;INT ((M-3*D)+.
5)
982 PRINT AT 19,0;"0"
985 LET M=M-3*D
990 NEXT Y
991 PRINT AT 11,22;"  NOTE"
992 PRINT AT 12,22;"VERT SCALE"
993 PRINT AT 13,22;"IS APPROX."
995 PRINT AT 17,22;"ENTER ""N""
"
1000 PRINT AT 18,22;"FOR NEWPAT"
1020 PRINT AT 20,22;"ENTER ""S""
"
1025 PRINT AT 21,22;"TO SAVE"
1030 INPUT U$
1040 IF U$="N" THEN GOTO 1070
1050 IF U$="S" THEN GOTO 9999
1060 GOTO 1030
1070 CLS
1080 RUN
2000 REM REF INPUT CHECK
2020 FOR F=1 TO LEN R$
2030 IF R$(F)<"." OR R$(F)>"9" T
HEN GOTO 2060
2040 NEXT F
2050 RETURN
2060 PRINT AT 20,0;"DIGITS ONLY-
-PLEASE ENTER AGAIN"
2070 FOR Q=1 TO 30
2080 NEXT Q
2090 PRINT AT 20,0;"
                   "
2100 GOTO 170
3000 REM MEAS INPUT CHECK
3005 FOR F=1 TO LEN L$
3010 IF L$(F)<"." OR L$(F)>"9" T
HEN GOTO 3040
3020 NEXT F
3025 LET L(N)=VAL L$
3030 RETURN
3040 SLOW
3045 PRINT AT 21,0;"DIGITS ONLY-
-ENTER AGAIN"
3050 FOR Q=1 TO 50
3060 NEXT Q
3070 PRINT AT 21,0;"
                   "
3075 FAST
3080 GOTO 370
9994 STOP
9995 CLS
9996 CLEAR
9997 SAVE "ANTPAT"
9998 RUN
9999 GOTO 9995
```



K6MZL

REACTANCE/RESONANCE CALCULATOR

THIS PROGRAM WILL BE THE MOST USEFUL ONE IN YOUR LIBRARY IF YOU DO ANY TYPE OF ELECTRONIC DESIGN. WITH IT YOU MAY QUICKLY FIND THE VALUES REQUIRED FOR RESONANT CIRCUITS OR AUDIO FILTERS. YOU MAY ALSO EASILY SCALE EXISTING DESIGNS FOR DIFFERENT FREQUENCIES.

- PRESS ANY KEY -

```
 0 REM PUBLIC DOMAIN SOFTWARE
       BY GLYNN SHAFFER -K6MZL
            MARTINEZ, CA. 1.3.83
 5 LET T$="
REACTANCE/RESONANCE CALCULATOR
"
 10 PRINT T$
 12 PRINT ,,,,,,"THIS PROGRAM W
ILL BE THE MOST   USEFUL ONE IN
YOUR LIBRARY IF   YOU DO ANY TYP
E OF ELECTRONIC   DESIGN. WITH I
T YOU MAY QUICKLY FIND THE VALUE
S REQUIRED FOR    RESONANT CIRCU
ITS OR AUDIO      FILTERS.  YOU
MAY ALSO EASILY   SCALE EXISTING
 DESIGNS FOR      DIFFERENT FREQ
UENCIES.          "
 15 GOSUB 900
 20 PRINT ,,,,,,"YOU WILL BE GI
VEN A CHOICE OF   ENTERING CAPAC
ITOR, INDUCTOR,   REACTANCE, OR
FREQUENCY VALUES. YOU MAY INPUT
THE VALUE OR PRESS""ENTER/NEWLIN
E"".  AFTER YOU   HAVE ENTERED
 ANY TWO VALUES THE PROGRAM WILL
 COMPUTE THE UNKNOWNVALUES, AND
PRINT THEM ON THE   SCREEN. DONT
 FORGET TO SPECIFY  THE TYPE OF
UNITS YOU ARE ENTER-ING (MFD, UH
, K OHMS, MHZ, ETC.)YOU MAY USE
SHORTHAND, E.G. .01MFOR .01 MFD.
 --HAPPY DESIGNING"
 25 GOSUB 900
 30 LET I$="- INPUT VALUE  OR
PRESS ENTER -"
 35 LET D$="
                   "
 40 PRINT T$;I$
 50 LET I=0
 55 LET T=6
 60 LET C=0
 65 LET L=0
 70 LET X=0
 75 LET F=0
 80 LET C$=""
 85 LET L$=""
 90 LET X$=""
 95 LET F$=""
100 IF C$<>"" THEN GOTO 150
102 PRINT AT T,0;D$
104 PRINT AT T,0;"CAPACITANCE I
N MFD. OR PF. ?
   (SPECIFY)"
106 INPUT C$
108 IF C$="" THEN GOTO 150
110 PRINT AT T+1,0;C$
112 IF CODE C$(1)>=38 THEN GOTO
102
114 FOR J=1 TO LEN C$
116 LET Q$=C$(J)
118 IF CODE Q$>=38 THEN GOTO 12
```

```
120 NEXT J
122 IF Q$="M" THEN LET C=VAL C$
( TO J-1)*1E-6
123 IF Q$="M" THEN LET C$=STR$
VAL C$( TO J-1)+" MFD"
124 IF Q$="P" THEN LET C=VAL C$
( TO J-1)*1E-12
125 IF Q$="P" THEN LET C$=STR$
VAL C$( TO J-1)+" PF"
126 IF C<>0 THEN GOTO 132
128 PRINT AT T+1,0;D$
130 GOTO 104
132 LET T=T+4
134 LET I=I+1
136 IF I=2 THEN GOTO 300
150 IF L$<>"" THEN GOTO 200
152 PRINT AT T,0;D$
154 PRINT AT T,0;"INDUCTANCE IN
UH.,MH. OR H. ?
   (SPECIFY)"
156 INPUT L$
158 IF L$="" THEN GOTO 200
160 PRINT AT T+1,0;L$
162 IF CODE L$(1)>=38 THEN GOTO
152
164 FOR J=1 TO LEN L$
166 LET Q$=L$(J)
168 IF CODE Q$>=38 THEN GOTO 17
2
170 NEXT J
172 IF Q$="H" THEN LET L=VAL L$
( TO J-1)
173 IF Q$="H" THEN LET L$=STR$
VAL L$( TO J-1)+" H"
174 IF Q$="U" THEN LET L=VAL L$
( TO J-1)*1E-6
175 IF Q$="U" THEN LET L$=STR$
VAL L$( TO J-1)+" UH"
176 IF Q$="M" THEN LET L=VAL L$
( TO J-1)*1E-3
177 IF Q$="M" THEN LET L$=STR$
VAL L$( TO J-1)+" MH"
178 IF L<>0 THEN GOTO 184
180 PRINT AT T+1,0;D$
182 GOTO 154
184 LET T=T+4
186 LET I=I+1
188 IF I=2 THEN GOTO 300
200 IF X$<>"" THEN GOTO 250
202 PRINT AT T,0;D$
204 PRINT AT T,0;"REACTANCE IN
OHMS ?"
205 INPUT X$
208 IF X$="" THEN GOTO 250
210 PRINT X$
212 IF CODE X$(1)>=38 THEN GOTO
202
214 FOR J=1 TO LEN X$
216 LET Q$=X$(J)
218 IF CODE Q$>=38 THEN GOTO 22
2
220 NEXT J
222 IF J-1=LEN X$ OR Q$="O" THE
N LET X=VAL X$( TO J-1)
223 IF J-1=LEN X$ OR Q$="O" THE
N LET X$=STR$ VAL X$( TO J-1)+"
OHMS"
224 IF Q$="K" THEN LET X=VAL X$
( TO J-1)*1E3
225 IF Q$="K" THEN LET X$=STR$
VAL X$( TO J-1)+" K"
226 IF Q$="M" THEN LET X=VAL X$
( TO J-1)*1E6
227 IF Q$="M" THEN LET X$=STR$
VAL X$( TO J-1)+" MEG"
228 IF X<>0 THEN GOTO 232
230 GOTO 202
232 LET T=T+4
234 LET I=I+1
236 IF I=2 THEN GOTO 300
250 IF F$<>"" THEN GOTO 100
252 PRINT AT T,0;D$
254 PRINT AT T,0;"FREQ. IN HZ.
KHZ. OR MHZ. ?
   (SPECIFY)"
256 INPUT F$
258 IF F$="" THEN GOTO 288
260 PRINT AT T+1,0;F$
262 IF CODE F$(1)>=38 THEN GOTO
252
264 FOR J=1 TO LEN F$
266 LET Q$=F$(J)
268 IF CODE Q$>=38 THEN GOTO 27
2
270 NEXT J
272 IF Q$="H" THEN LET F=VAL F$
( TO J-1)
273 IF Q$="H" THEN LET F$=STR$
VAL F$( TO J-1)+" HZ"
274 IF Q$="K" THEN LET F=VAL F$
( TO J-1)*1E3
275 IF Q$="K" THEN LET F$=STR$
VAL F$( TO J-1)+" KHZ"
276 IF Q$="M" THEN LET F=VAL F$
( TO J-1)*1E6
277 IF Q$="M" THEN LET F$=STR$
VAL F$( TO J-1)+" MHZ"
278 IF F<>0 THEN GOTO 284
280 PRINT AT T+1,0;D$
282 GOTO 254
284 LET T=T+4
286 LET I=I+1
288 IF I<2 THEN GOTO 100
300 PRINT AT 15,4;"****** COMPU
TING ******"
310 IF C$="" AND L$="" THEN GOT
O 400
320 IF C$="" AND X$="" THEN GOT
O 450
330 IF C$="" AND F$="" THEN GOT
O 500
340 IF L$="" AND X$="" THEN GOT
O 550
350 IF L$="" AND F$="" THEN GOT
O 600
360 IF X$="" AND F$="" THEN GOT
O 650
400 REM C/L
410 LET A$="(1/(2*PI*F*X))"
420 LET B$="(X/(2*PI*F))"
430 GOTO 700
450 REM C/X
460 LET A$="(1/(4*PI**2*F**2*L)
)"
470 LET Y$="(2*PI*F*L)"
480 GOTO 700
500 REM C/F
510 LET E$="(X/(2*PI*L))"
520 LET A$="(1/(2*PI*VAL E$*X))
"
530 GOTO 700
550 REM L/X
560 LET B$="(1/(4*PI**2*F**2*C)
)"
570 LET Y$="(1/(2*PI*F*C))"
580 GOTO 700
600 REM L/F
610 LET E$="(1/(2*PI*X*C))"
620 LET B$="(X/(2*PI*VAL E$))"
630 GOTO 700
650 REM X/F
655 LET E$="(1/(2*PI*50R (L*C))
)"
660 LET Y$="1/(2*PI*C*VAL E$)"
700 REM A$/C$=CAP    B$/L$=IND
          E$/F$=FREQ    Y$/X$=OHMS
705 IF C$<>"" THEN GOTO 725
710 IF VAL A$>=1E-6 THEN LET C$
=STR$ (INT (VAL A$*1E8+.5)/1E2)+
" MFD."
720 IF VAL A$<=1E-6 THEN LET C$
=STR$ (INT (VAL A$*1E13+.5)/10)+
" PF."
725 IF L$<>"" THEN GOTO 745
730 LET L$=STR$ (INT VAL B$+.5)
+" H"
735 IF VAL B$<=1 THEN LET L$=ST
R$ INT (VAL B$*1E3+.5)+" MH"
740 IF VAL B$<=1E-3 THEN LET L$
=STR$ (INT (VAL B$*1E8+.5)/1E2)+
" UH"
745 IF F$<>"" THEN GOTO 775
750 LET F$=STR$ (INT (VAL E$*1E
2+.5)/1E2)+" HZ"
760 IF VAL E$>=1E3 THEN LET F$=
STR$ (INT (VAL E$/1E3*1E2+.5)/1E
2)+" KHZ"
770 IF VAL E$>=1E6 THEN LET F$=
STR$ (INT (VAL E$/1E6*1E2+.5)/1E
2)+" MHZ"
775 IF X$<>"" THEN GOTO 800
780 LET X$=STR$ (INT (VAL Y$*10
+.5)/10)+" OHMS"
785 IF VAL Y$>=1E5 THEN LET X$=
STR$ (INT (VAL Y$/1E5*10+.5)/10)
+" K"
790 IF VAL Y$>=1E6 THEN LET X$=
STR$ (INT (VAL Y$/1E6*10+.5)/10)
+" MEG."
800 PRINT AT 15,0;D$
850 PRINT AT 15,0;"CAP.= ";C$;A
T 15,18;"X= ";X$
860 PRINT AT 17,0;"IND.= ";L$;A
T 17,18;"F= ";F$
870 GOSUB 900
880 GOTO 40
900 PRINT AT 20,6;"- PRESS ANY
KEY -"
910 PAUSE 4E4
920 CLS
930 RETURN
999 SAVE "X"CALCULATOR
1000 SLOW
1001 RUN
```

YOU WILL BE GIVEN A CHOICE OF ENTERING CAPACITOR, INDUCTOR, REACTANCE, OR FREQUENCY VALUES. YOU MAY INPUT THE VALUE OR PRESS "ENTER/NEWLINE". AFTER YOU HAVE ENTERED ANY TWO VALUES THE PROGRAM WILL COMPUTE THE UNKNOWN VALUES, AND PRINT THEM ON THE SCREEN. DONT FORGET TO SPECIFY THE TYPE OF UNITS YOU ARE ENTERING (MFD, UH, K OHMS, MHZ, ETC.) YOU MAY USE SHORTHAND, E.G. .01M FOR .01 MFD. --HAPPY DESIGNING

```
 REACTANCE/RESONANCE CALCULATOR
- INPUT VALUE  OR  PRESS ENTER -

CAPACITANCE IN MFD. OR PF. ?
.01 MFD              (SPECIFY)

INDUCTANCE IN UH.,MH. OR H. ?
1 UH                 (SPECIFY)


CAP.= .01 MFD        X= 10 OHMS

IND.= 1 UH           F= 1.59 MHZ
```

```
 REACTANCE/RESONANCE CALCULATOR
- INPUT VALUE  OR  PRESS ENTER -

FREQ. IN HZ., KHZ. OR MHZ. ?
1000 HZ              (SPECIFY)

CAPACITANCE IN MFD. OR PF. ?
6 PF                 (SPECIFY)


CAP.= 6 PF           X= 26.5 MEG.

IND.= 4221.5 H       F= 1000 HZ
```

NEW IMPROVED ROM BUGS--- TS1500 BUG #1

by John Kemeny

Here we go again. No sooner has Timex introduced their TS1500, with the new improved ROM that corrects the mistakes of the TS1000 ROM, than new bugs appear. It is a common occurance in computer programming that fixing one bug causes another. Unfortunately, when you put the programs on a ROM, there's not much to do about it. This bug will affect people who use the area above RAMTOP to save data between LOADs.

Specifically, the bug, discovered by Dave Wood, occurs when a LOAD command aborts. In the TS1000 ROM, if a LOAD aborts, a jump is made to the initialization routine at 03E5h, which is part of NEW. This routine resets the machine stack which is just below RAMTOP.

The TS1500 ROM jumps to an address which is actually in the middle of an instruction! The problem is that address 0362h has been changed E5h to E3h instead of E2h.

This bug causes unpredictable results upon LOAD failure. Even if the system doesnt crash, the stack may be reset above or below RAMTOP. So if a LOAD fails, you may corrupt the stuff above RAMTOP.

We should point out that this bug is not such a problem if you don't have stuff above RAMTOP. Then it is just an inconvenience making you pull the plug and perhap re-reset RAMTOP. Let's just hope that the LOADs on the TS1500 are MUCH more reliable than on the TS1000.

FROM THE BOSTON COMPUTER SOCIETY NEWSLETTER

```
   2 REM DALE MILLER -W5RRP
   3 REM R 5 BOX 22K
   4 REM SLIDELL LA 70460
   5 REM "EIGHT"
   6 REM EIGHT RF TUNED CIRCUIT-
COIL DESIGN-AND CAPACITOR NETWOR
K  PROBLEM SOLVING PROGRAMS
   7 REM A MENU PROGRAM SELECTIO
N GUIDE IS PROVIDED
  10 PRINT
  15 PRINT "GOTO LINE NUMBER FOR
 CALCULAT-  ION DESIRED"
  20 PRINT
  25 PRINT "100, UHY, PF, FOR MH
Z"
  30 PRINT
  35 PRINT "200, KNOWN UHY OR PF
, MHZ,          FOR  UNKNOWN UH
Y OR PF"
  40 PRINT
  45 PRINT "300, MHZ EXISTING, N
EW MHZ, UHY,    AND PF, AT EXIS
TING"
  47 PRINT "      MHZ, FOR UHY AN
D PF AT NEW     MHZ"
  50 PRINT
  52 PRINT
  55 PRINT "400, COIL DIAMETER,
LENGTH,         NUMBER OF TURNS
, FOR UHY"
  60 PRINT
  65 PRINT "500, COIL DIAMETER,
LENGTH,         DESIRED UHY, FO
R NUMBER OF     TURNS"
  70 PRINT
  71 PRINT "KEY CONT FOR BALANCE
 OF LIST"
  72 PRINT
  73 PRINT
  74 PRINT
  75 PRINT "600, NUMBER OF TURNS
, UHY AT        THIS NUMBER OF
TURNS,"
  77 PRINT "      DESIRED NEW UHY
, FOR           NUMBER OF  TURN
S AT NEW        UHY,"
  80 PRINT "      COIL DIMENSIONS
 UNCHANGED"
  82 PRINT
  85 PRINT "700, CAPACITY, SERIE
S CAPACITY,     FOR TOTAL SERIE
S CAPACITY"
  87 PRINT
  90 PRINT "800, CAPACITY, DESIR
ED TOTAL        SERIES CAPACITY
, FOR SERIES    CAPACITY NEEDED

  95 STOP
 100 PRINT
 105 PRINT "ENTER UHY, PF, FOR M
HZ"
 107 PRINT
 110 INPUT A
 111 PRINT A;" UHY"
 112 PRINT
 115 INPUT B
 116 PRINT B;" PF"
 117 PRINT
 120 LET C=1/(.002*PI*SQR (A*B))
 125 PRINT C;" MHZ"
 130 STOP
 200 PRINT
 205 PRINT "ENTER KNOWN UHY OR P
F, MHZ, FOR UNKNOWN UHY OR PF"
 206 PRINT "IF KNOWN IS UHY KEY
(1),IF PF  KEY (2)"
 207 INPUT X
 208 PRINT
 212 IF X=1 THEN GOTO 243
 213 IF X=2 THEN GOTO 214
 214 INPUT A
 215 PRINT A;" PF"
 216 PRINT
 220 INPUT B
 225 PRINT B;" MHZ"
 228 PRINT
 235 GOTO 255
```



```
 243 INPUT A
 244 INPUT B
 245 PRINT A;" UHY"
 246 PRINT
 250 PRINT B;" MHZ"
 255 PRINT
 260 LET C=1/(.002**2*PI**2*B**2
*A)
 265 IF X=1 THEN GOTO 285
 266 IF X=2 THEN GOTO 290
 285 PRINT C;" PF"
 286 STOP
 290 PRINT C;" UHY"
 291 STOP
 300 PRINT
 305 PRINT "ENTER EXISTING MHZ,
NEW MHZ,    UHY AND PF AT EXISTI
NG MHZ, FOR UHY AND PF AT NEW MH
Z"
 307 PRINT
 310 INPUT A
 311 PRINT A;" MHZ EXISTING"
 312 PRINT
 315 INPUT B
 316 PRINT B;" MHZ NEW"
 317 PRINT
 320 INPUT C
 321 PRINT C;" UHY EXISTING"
 322 PRINT
 323 INPUT D
 324 PRINT D;" PF EXISTING"
 325 PRINT
 326 PRINT "UHY AND PF AT NEW MH
Z"
 330 LET M=(A/B)*C
 333 PRINT
 335 PRINT M;" UHY NEW"
 345 PRINT
 350 LET N=(A/B)*D
 355 PRINT N;" PF NEW"
 360 STOP
 400 PRINT
 405 PRINT "ENTER COIL DIAMETER
AND LENGTH, IN INCHES, NUMBER OF
 TURNS,     FOR UHY"
 407 PRINT
 410 INPUT A
 411 PRINT A;" INCHES, DIA"
 412 PRINT
 415 INPUT B
 416 PRINT B;" INCHES LGTH"
 417 PRINT
 420 INPUT C
 421 PRINT C;" TURNS"
 422 PRINT
 425 LET D=(A**2*C**2)/(18*A+40*
B)
 435 PRINT D;" UHY"
 440 STOP
 500 PRINT
 505 PRINT "ENTER COIL DIAMETER
AND LENGTH, IN INCHES, DESIRED U
HY, FOR     NUMBER OF TURNS"
 507 PRINT
 510 INPUT A
 511 PRINT A;" INCHES DIA"
 512 PRINT
 515 INPUT B
 516 PRINT B;" INCHES LGTH"
 517 PRINT
 520 INPUT C
 521 PRINT C;" UHY DESIRED"
 522 PRINT
 525 LET D=SQR (((18*A+40*B)*C)/
A**2)
 530 PRINT D;" TURNS"
 535 STOP
 600 PRINT
 605 PRINT "ENTER NUMBER OF TURN
S, UHY,"
 610 PRINT "NEW UHY, FOR NUMBER
TURNS AT    NEW UHY,"
 611 PRINT "COIL DIMENSIONS UNCH
ANGED"
 613 PRINT
 615 INPUT A
```

```
 616 PRINT A;" TURNS EXISTING"
 617 PRINT
 620 INPUT B
 621 PRINT B;" UHY EXISTING"
 622 PRINT
 625 INPUT C
 626 PRINT C;" UHY NEW"
 627 PRINT
 630 LET D=A*SQR (C/B)
 640 PRINT D;" TURNS NEW"
 645 STOP
 700 PRINT
 705 PRINT "ENTER CAPACITOR, SER
IES CAP-    ACITOR,FOR TOTAL SER
IES         CAPACITY"
 707 PRINT "CAPACITY ALL IN SAME
 ORDER OF   MAGNITUDE"
 708 PRINT
 710 INPUT A
 711 PRINT A;" UFD"
 712 PRINT
 715 INPUT B
 716 PRINT B;" UFD"
 717 PRINT
 720 LET C=A*B/(A+B)
 730 PRINT C;" SERIES TOTAL CAPA
CITY"
 735 STOP
 800 PRINT
 805 PRINT "ENTER CAPACITOR, DES
IRED VALUE  OF SERIES TOTAL CAPA
CITY,       FOR SERIES CAPACITOR
 NEEDED"
 807 PRINT "CAPACITY ALL IN SAME
 ORDER OF   MAGNITUDE"
 810 PRINT
 815 INPUT A
 816 PRINT A;" UFD"
 817 PRINT
 820 INPUT B
 821 PRINT B;" UFD SERIES DESIRE
D"
 822 PRINT
 825 LET C=A*B/(A-B)
 826 PRINT
 830 PRINT C;" UFD SERIES NEEDED
"
 835 STOP
 840 SAVE "EIGH"
 845 GOTO 10
```

QZX NET INFO

FREQ	TIME	DAY	SOURCE	LOCATION	
3.600	1930	WED	G4INP	EUROPE	*
3.755	0000	THU	VE1BRA	ONTARIO	
3.755	0100	WED	VE3KHQ	ONTARIO	
3.905	1400	UNK	W6SYP	PERSONAL NET	
3.980	0100	SAT	N3CJP	EAST COAST	*
4.020	0000	WED	WB5HVS	LA (MARS)	*
7.228	1900	SAT	K4KEP	EAST COAST	*
7.228	1900	SUN	K4KEP	EAST COAST	*
7.235	1700	SAT	W6AMW	WEST COAST	*
7.240	1600	SUN	KQ2F	EAST COAST	
7.245	0001	WED	W9CQD	USA	*
14.150	1900	THU	G4INP	EUROPE	*
14.200	1000	SAT	G4INP	EUROPE	*
14.200	1400	SAT	G4INP	EUROPE	*
14.200	1000	SUN	G4INP	EUROPE	*
14.329	2000	SUN	W9CQD	USA	*
14.345	0100	THU	NU4V	USA	*
146.04	0100	THU	KB3YT	PITTSBURGH	
146.16	0000	THU	N1CB	VERMONT/NH	*
146.67	0230	TUE	K5XY	MANHATTEN,NY	*
147.84	0000	WED	WB5HVS	NEW ORLEANS	

```
GOTO LINE NUMBER FOR CALCULAT-
ION DESIRED

100, UHY, PF, FOR MHZ

200, KNOWN UHY OR PF, MHZ,
     FOR  UNKNOWN UHY OR PF

300, MHZ EXISTING, NEW MHZ, UHY,
     AND PF, AT EXISTING
     MHZ, FOR UHY AND PF AT NEW
     MHZ


400, COIL DIAMETER, LENGTH,
     NUMBER OF TURNS, FOR UHY

500, COIL DIAMETER, LENGTH,
     DESIRED UHY, FOR NUMBER OF
     TURNS

KEY CONT FOR BALANCE OF LIST


600, NUMBER OF TURNS, UHY AT
     THIS NUMBER OF TURNS,
     DESIRED NEW UHY, FOR
     NUMBER OF  TURNS AT NEW
     UHY,
     COIL DIMENSIONS UNCHANGED

700, CAPACITY, SERIES CAPACITY,
     FOR TOTAL SERIES CAPACITY

800, CAPACITY, DESIRED TOTAL
     SERIES CAPACITY, FOR SERIES
     CAPACITY NEEDED
```

All times in GMT. Beware of daylight savings and of wrong day.
* means info on net is over 6 Mo old

Editor's Doings
Bo Barry, W4GHV/5

First, I want to apologize for the faint printing in the last issue. I knew my printer ribbon was about gone but didn't know it would come out that bad!

Second, I'm running behind as usual, trying to finish up the semester. If by chance any of you are interested in college teaching, have a masters degree (or thereabouts), and are electronically inclined, we will be announcing a job position in our Engineering Technology Department soon. Send SASE for a copy of the announcement when it is available. I could write pages & pages about how much I enjoy my job but would anger those of you stuck with an unpleasant one, like I was most of my life.

I had planned to put together some info on Sinclair's new 68000 computer, but haven't done it yet. First glance indicates it is going to be nice & a bit more expensive than the ZX-81! Also planned was more info on a nice color add-on project. I want to thank all of you again for sending copies of the T/S color article. It turned out to be much too messy and not as feasible as another one that I am working on. I have several Motorola Micro-Chroma 68 kits, which would make a good color add-on for any computer. I have a few for sale (at about $75) if you are interested. They are a 'stand-alone' 6802 computer system, requiring 5VDC and a parallel ASCII keyboard input. It uses the 6847 color chip as in the T/S article, and puts out a nice color signal on channel 2. It has a built-in operating system, allowing memory change, examine, program execution, tape load/save, etc. It has room for 16K RAM , thus not eating up any of the Sinclair's memory. If you have a parallel interface for your Sinclair and are a serious hardware type, write for more details.

Still investigating the differences between the TS-1000 & TS-1500, I wrote several people at Timex, and received a nice large 'blueprint' schematic of the 1500. If it can be shrunk, I will put it in QZX. As some of you probably know, the cassette input circuitry is a bit different. I hope to study it, and the Z-Dubber which doesn't work with the 1500.

We finally got the 'article payment gifts' in the mail, if you haven't received anything, let us know. If you have any questions or problems with them, let me know.

NRTU NU4V RTTY Terminal Unit

Those of you who have procrastinated in building a TU/AFSK or who aren't quite satisfied with the one you have may want to try Cliff's new RTTY terminal unit. It provides demodulation of FSK tones (LM3900 active filters), has a tone generator for sending (XR2206), and a PTT keying transistor. The bare board is $16.00 postpaid. Contact him for details.

That's about it, I am cutting & pasting the May issue as the April issue goes to the printer, so we should catch up sooner or later. Thanks again for all the nice letters, articles, and compliments.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: ZX81/TS1000 edgeboard wire-wrap connectors; keyed; bifurcated contacts; manufactured by TI; $5.00 each. Pc piggy-back extender boards; $1.50 each. Economical experimenting with Radio-Shack's 276-158 and 161 project boards and these connectors. Add $0.75 shipping per order. Paul Hunter, 1630 Forest Hills Drive, Okemos, MI 48864.

FOR SALE: Surplus keyboards suitable for T/S 1000. $30.00 including postage. Edge connectors. Edge connectors sold out. For details on adding the keyboards to the ZX81 and T/S computers see Dec '82 QZX. Alex. F. Burr, 2025 O'Donnell, Las Cruces, NM 88001.

FREE: Model 19 teletype with books to give away free to the first reader of QZX who showes up here to get it. Dallas Williams WA0MRG/0, Box 1, Sedgwick, CO, 80749.

WANTED: Information on a dot-addressable, dot-matrix printer ($200/$500), (with some buffer storage, 1 to 2K), plus circuit details enableing hookup to my 2068. Walter E. Parry, Velie road, Lagrangeville, NY 12540.

Modify Timex program "The Organizer" for use with Qsave listing $2.15. Fred Du Vall, RT. 4, Box 165 A, Clinton, AR. 72031.

QZX FRIENDS

AJ6T -- Walter has both a ZX81 (now in a Gladstone keyboard) and a TS 2068. He is especially interested in programs for the 2068 and askes if anyone has a fix for the TVI which the 2068 generates. He has the NU4V cw program and interface for the ZX81 and finds it a bit susceptible to QRN pulses which cause a jumble of extra e's and t's. He would like a cwss modification for break in operation with automatic return to receive mode when the transmit buffer is empty.

W4DRM -- Perry started off with a ZX80 and now has a TS1000 and a TS2068 as well as a printer and a large keyboard.

VE3EFC -- Bill says that the two programs in QZX that he likes best are the MUF and the phased vertical design programs. He also runs a phone line bulletin service which will handle T/S computers at (807) 622-2685.

VE3KHQ -- Fred renewed, has a ZX81, 16K, and the CWSS cw progra He also sent in some much needed net info.

W5UIH -- Bob is active in RTTY with two mechanical terminals. He is busy gathering information on how to put his T/S 1000 on RTTY too.

V*6MOU -- Gerry says that he belongs to a small users group up North in British Columbia which meets every 2nd Wednesday of the month.

KA2LHO -- Kraig sent us a description of his setup which is quite extensive. He has a ZX81 mounted in the Gladstone keyboard, three Timex 16K RAMs, one 64K RAM, a ZX printer, a T/S 2040 printer, a RS 232 module, a Brother EP-22 printer, and a T/S 1000. He has added reset switches, joysticks, and shift locks to both computers. He uses mostly his own software (much of which has appeared in QZX) along with the CWSS program of

NU4V. He is a high school music teacher and his wife is a Methodist minister so they move around a lot.

WAILOU -- Stan, of QST "On Line" fame writes that he is looking at one of the T/S 2068's closing out at $99.95.

K2DFR -- Walt has a Sharp 1500, a ZX81 with a Hunter 8K cmos board, and a T/S 1000 for reserve. He also has a 2068 which is great. He has tried to get the modem for the 2068 but has received reports that the first batch had problems and another lot was not ordered.

K4VIZ -- Tom called to say that he went shopping for T/S bargains and when one store said that another related store had ZX81's for sale at $20 he rushed over to get one. When he got home, he opened the box and found a T/S 2068. (The manual was missing however; so he is looking to borrow one to copy.)

BITS AND BYTES

40 WB4FXD submitted a simple change to Dallas Willian's "WORD PROS" program that was in the Nov 83 QZX that will "unshift-on-space" while typing out the program on a Baudot machine. As it was printed, the TTY machine will not unshift. Change line 9706 to read

```
9706 IF CODE A$ < 38 AND CODE A$ <> 0 THEN LET B = 63
```

He states that he got this modification from Dallas. Also his T/S 1000 would not print the last line (9772 RETURN) until he changed line 9638 to read "... <9773..." instead of "...<9900...". He doesn't know why, but it fixed it.

41 Be cautious about very high speed data transfer. A friend from Los Alamos, where they have some of the fastest computers in the world, was down loading a file from his Timex into a Cray-1, and the data apparently was transferred so quickly that a vacuum was created inside the Timex which resulted in an implosion and some superficial facial injuries. (He was struck by some flying microbits.) The Timex involved is now a mass of plasitic and broken chips about the size of a small stone.

PUBLISHER'S NOTES

We have taken yet another step in the direction of computer-ization. Bo has started up a QZX bulletin board. QZX can now be reached by computer. Just call (505) 646-5194 and hit ENTER when you get the carrier. Follow the simple sign in instructions for the message system and leave your message for ALEX BURR or SYSOP (which will get Bo).

An analysis of our mailing list is always interesting. A summary just printed out shows people from almost all the states and about 20 different countries. The only states we are missing are Montana and South Dakota. California is the big leader with 75 names; followed by New York with 49. Florida, Illinois, New Jersey, Pennsylvania, and Texas round out the top seven. Unfortunately, all on our list are not subscribers.

And we can always use more. A recent mention in the RTTY column of 73 produced a few new subscribers. Also the fact that some of our readers mentioned us to some vendors may result in some more advertising, which will permit a better newletter.

It is still possible in some cases to get technical information about the T/S computers from Timex. Write to Timex Materials Sales Division, Box 1378, Little Rock, AR 72203. They say that no information is available for products which have not yet been shipped, including the Modem, System Interface Unit, 80-Column Printer, or the Microdrives for the T/S 2068. They say that accessories and peripherals marketed for the ZX Spectrum will not, in general, directly interconnect with the T/S 2068; and they have no information on modifications required for such an interconnection.

73, W4GHV and K5XY

QZX presents the best software and hardware projects available for the radio amateur. While the contents are believed to be accurate, no warranty is extended on any program or project. No investigation has been made of the claims or reputation of any advertiser. It would be greatly appreciated if all correspondance requiring an answer would be accompanied by a self stamped envelope (SASE). Copyright by QZX, 1983. All rights reserved, Photocopying by permission only.

```
**************************************
* Please send me QZX for 1 year,     *
*starting immediately. Enclosed is   *
* $12.00 for first class             *
* mailing. (Those with addresses     *
* not in Canada, the U.S, or Mexico  *
* send $19.00 in U.S. funds for      *
* air mail delivery.. Thanks (4/84)  *
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*                                    *
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*                                    *
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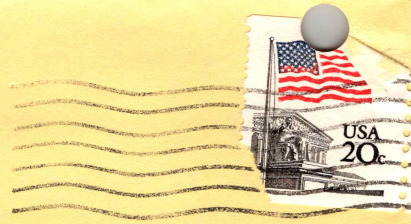
QZX
2025 O'Donnell Dr.
Las Cruces, N.M. 88001

LAS CRUCES, NM
MAY 3
1984



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84/03